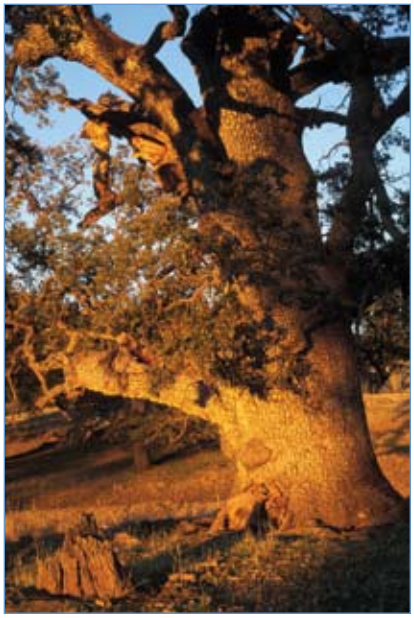
10 Central Coast Region

California's Central Coast Region encompasses approximately 8 million acres and extends from the southern boundary of the Los Padres National Forest north to the San Francisco Bay lowlands. Inland, the region is bounded east of the Diablo and Temblor mountain ranges. The Central Coast landscape is characterized by a rugged coastline, small mountain ranges that roughly parallel the coast, river valleys with rich alluvial soils, and arid interior valleys and hills. Across the region, differences in climate, geography, and soils result in widely varying ecological conditions, supporting diverse coastal, montane, and desertlike natural communities.



Tim Palmer

Sand dunes and wetlands occur along the coast. River-mouth estuaries, lagoons, sloughs, tidal mudflats, and marshes make up coastal wetland communities, a unique environment where marine, freshwater, and terrestrial systems meet. Coastal habitats support numerous shorebirds, including the Western snowy plover, willet, whimbrel, long-billed curlew, marbled godwit, and American avocet. Coastal estuaries provide important nursery habitats for **anadromous** and oceanic fish, especially in water-

sheds where small or seasonally dry upper tributaries provide limited rearing capacity (CDFG 1996). Elkhorn Slough and Morro Bay are the region's two largest estuaries, with other significant wetlands found at the Pajaro, Salinas, and Santa Maria river mouths, Devereux Slough, and Goleta Slough (Page and Shuford 2000).

Other coastal habitats include coastal scrub and maritime chaparral. Coastal scrub and grasslands also extend inland along river valleys, like the lower Salinas Valley, where the moist maritime climate reaches through gaps in the coastal ranges. Maritime chaparral, characterized by manzanita and California lilac species adapted to the foggy coastal climate, once dominated sandy hills along Monterey Bay, Nipomo Mesa, Burton Mesa, and Morro Bay. Maritime chaparral is now one of the region's most threatened community types, with its extent severely reduced by development. These scrub and chaparral communities provide important habitat for Morro Bay-, Santa Cruz-, and Pacific kangaroo rat species and the San Diego desert woodrat, as well as shrubland bird species, including California quail, sage sparrow, rufous-crowned sparrow, and the sensitive California thrasher and Costa's hummingbird.

The outer coast ranges, including the Santa Cruz and Santa Lucia mountains, run parallel to the coastline. Well-watered by the moist ocean air, these slopes are drained by streams that run all year. The Santa Lucia Mountains provide most of the water supply to the Salinas River. These ranges support mixed coniferous forests and oak woodlands. The dominant coniferous species include ponderosa pine, Douglas fir, red alder, and, in the north, redwoods. The oak woodlands are dominated by coast live oak and valley oak. Rarer, **endemic** tree species include Monterey pine and Santa Lucia fir. Wildlife inhabitants of the outer coast mountains include wide-ranging species such as mountain lion and bobcat and **sensitive species** that include the California spotted owl, American badger, peregrine falcon, and golden eagle.

Moving inland across the Gabilan, Diablo, Temblor, and Sierra Madre mountain ranges, the climate becomes progressively drier, and the vegetation shifts to oak woodlands, grasslands, interior chaparral, and desert-like interior scrub. Interior streams are mostly intermittent, drying in the summer and fall, except at the higher elevations of the Sierra Madre ranges, where streams run year round. Biologically diverse oak woodland communities support more than 200 species of plants, 300 vertebrates, and 5,000 invertebrates (Thorne et al. 2002, TNC 1997). Inhabitants of oak woodlands include Western gray squirrel, dusky-footed woodrat, Monterey dusky-footed woodrat, pallid bat, and Townsend's big-eared bat (the latter three being Fish and Game species of concern). Large expanses of annual grass-

lands, now dominated by non-native grasses, are inhabited by California ground squirrel and black-tailed jackrabbit, along with sensitive species that include the giant kangaroo rat, burrowing owl, San Joaquin kit fox, American badger, and, in the southern portion of the region, reintroduced tule elk and pronghorn. Interior chaparral habitats support drought-resistant woody shrubs, including manzanita, California lilac, and chamise.

The Central Coast's largest drainages include the Salinas, Santa Maria, Pajaro, and Santa Ynez watersheds. Riverine and riparian habitats are important to amphibian and reptile species, including the California red-legged frog, foothill yellow-legged frog, and Western pond turtle, and birds such as the bank swallow, Lawrence's goldfinch (on Fish and Game's Special Animals List), and least Bell's vireo (federally listed as endangered). Steelhead and coho salmon (both federally listed as threatened) are still present, in small numbers, in most of the streams where they historically occurred. Mammals that use riparian habitats include gray fox, striped skunk, mole and shrew species, and ringtail.

Higher-elevation riparian vegetation in moist coastal climates includes willow, alder, bay, maple, Douglas fir, and sometimes redwood, while valley-bottom riparian communities are dominated by sycamore, willow, alder, and cottonwood. Steep coastal streams in the forested Santa Cruz and northern Santa Lucia mountains are some of the region's most intact systems and host relatively healthy anadromous fish populations (CDFG 1996). In contrast, the majority of the region's large river-valley floodplain and riparian forests have been replaced by agriculture, and lowland fish assemblages have been severely compromised.

Seasonal vernal-pool wetland complexes are found in many parts of the region, including the Salinas River drainage and coastal dune terraces and mesas of Santa Barbara County, and seasonal sag ponds are found along the San Andreas fault zone, particularly in the eastern portion of San Luis Obispo County. California tiger salamanders, Western spadefoot toads, fairy shrimp species, and many endemic plant species depend on these unique seasonal pool habitats.

The San Andreas Fault runs the length of the region and shapes much of the region's geography. Most of the north-south running mountain ranges and valley depressions have been formed as a result of pressure between the two continental plates meeting at this fault zone. Compression, chemical interaction, and surfacing of ancient seabed sediments have produced serpentine soils that are rich in such metals as chromium, nickel, and cobalt, but poor in nutrients. A number of plants have adapted to these harsh, near-toxic conditions, resulting in unique, island-like ecological communities largely restricted to serpentine areas.

Several sensitive invertebrates, such as Opler's longhorn moth, also are dependent on or strongly associated with serpentine plant species (USFWS 1998e, TNC 1997).

Historically, urban centers have been located along the region's coastal lowlands, with crop production concentrated in valley-floor areas and grazing and natural lands occupying the surrounding foothills and mountainous areas. In recent years, however, population pressures have increased, and growth and development have expanded from urban centers to adjacent farmlands and rural areas both on the coast and in the interior portions of the region. Along with population growth, the greatest threats to regional wildlife diversity are expansion of intensive types of agriculture, invasions by exotic species, and overuse of regional water resources. In spite of these significant regional stressors, large blocks of undeveloped natural lands remain, and the region presents many opportunities to accomplish conservation on a landscape-scale.

Species at Risk

The Plan development team updated vertebrate and invertebrate species information of the California Natural Diversity Data Base (CNDDB) in 2004–2005. The following regional summary of numbers of wildlife species, endemic species, and **species at risk** is derived from the updated CNDDB.

The Central Coast's wide range of habitats has given rise to remarkable biological diversity. There are 482 vertebrate species that inhabit the Central Coast region at some point in their life cycle, including 283 birds, 87 mammals, 42 reptiles, 25 amphibians, and 45 fish. Of the total vertebrate species that inhabit this region, 80 bird **taxa**, 36 mammalian taxa, 14 reptilian taxa, eight amphibian taxa, and 15 fish taxa are included on the **Special Animals List.** Of these, 13 are endemic to the Central Coast region, one is endemic to California but introduced to this region, and 24 other species found here are endemic to California but not restricted to this region (Table 10.1).

Table 10.1: State-Endemic Special Status Vertebrates of the Central Coast Region

	Ambystoma californiense	California tiger salamander
*	*Ambystoma macrodactylum croceum*	Santa Cruz long-toed salamander
	Ammospermophilus nelsoni	Nelson's antelope squirrel
*	*Anniella pulchra nigra*	Black legless lizard
	Anniella pulchra pulchra	Silvery legless lizard

	Archoplites interruptus	Sacramento perch
	Catostomus santaanae	Santa Ana sucker
	Charina umbratica	Southern rubber boa
	Dipodomys heermanni berkeleyensis	Berkeley kangaroo rat
*	*Dipodomys heermanni morroensis*	Morro Bay kangaroo rat
	Dipodomys ingens	Giant kangaroo rat
	Dipodomys nitratoides brevinasus	Short-nosed kangaroo rat
*	*Dipodomys venustus elephantinus*	Big-eared kangaroo rat
	Dipodomys venustus venustus	Santa Cruz kangaroo rat
	Eucyclogobius newberryi	Tidewater goby
	Gambelia sila	Blunt-nosed leopard lizard
	Gasterosteus aculeatus williamsoni	Unarmored threespine stickleback
	Geothlypis trichas sinuosa	Saltmarsh common yellowthroat
+	*Gila orcutti*	Arroyo chub
*	*Lavinia exilicauda harengus*	Pajaro/Salinas hitch
	Lavinia symmetricus ssp. 1	San Joaquin roach
*	*Lavinia symmetricus subditus*	Monterey roach
	Masticophis flagellum ruddocki	San Joaquin whipsnake
	Masticophis lateralis euryxanthus	Alameda whipsnake
*	*Microtus californicus halophilus*	Monterey vole
*	*Neotoma fuscipes annectens*	San Francisco dusky-footed woodrat
*	*Neotoma macrotis luciana*	Monterey dusky-footed woodrat
	Onychomys torridus tularensis	Tulare grasshopper mouse
	Perognathus alticolus inexpectatus	Tehachapi pocket mouse
	Perognathus inornatus inornatus	San Joaquin pocket mouse
	Perognathus inornatus neglectus	McKittrick pocket mouse
*	*Perognathus inornatus psammophilus*	Salinas pocket mouse
	Rallus longirostris obsoletus	California clapper rail
*	*Reithrodontomys megalotis distichlis*	Salinas harvest mouse
*	*Sorex ornatus salarius*	Monterey shrew
*	*Sorex vagrans paludivagus*	Monterey vagrant shrew
	Tamias speciosus callipeplus	Mount Pinos chipmunk
	Taricha torosa torosa	Coast Range newt
	Thamnophis sirtalis tetrataenia	San Francisco garter snake
	Vulpes macrotis mutica	San Joaquin kit fox

* denotes taxon is endemic to region

+ denotes taxon is endemic to California but introduced in this region

The number of arthropod species is so great, and they are so poorly known taxonomically, that it is presently impossible to accurately estimate the total number of invertebrate species occurring in the state. In the Central Coast region, however, 60 invertebrate taxa are included on the Special Animals List, including 57 arthropod taxa and three mollusk taxa. Of these, 32 are endemic to the Central Coast region, and 25 other taxa found here are endemic to California but not restricted to this region (Table 10.2).

Table 10.2: State-Endemic Special Status Invertebrates of the Central Coast Region

*	*Ablautus schlingeri*	Oso Flaco robber fly
	Adela oplerella	Opler's longhorn moth
	Aegialia concinna	Ciervo aegilian scarab beetle
*	*Ammopelmatus muwu*	Point Conception Jerusalem cricket
*	*Areniscythris brachypteris*	Oso Flaco flightless moth
	Branchinecta longiantenna	Longhorn fairy shrimp
	Caecidotea tomalensis	Tomales isopod
*	*Calicina minor*	Edgewood blind harvestman
*	*Calicina arida*	A harvestman; no common name
*	*Calileptoneta ubicki*	Ubick's calileptoneta spider
	Ceratochrysis longimala	A chrysidid wasp; no common name
	Certaochrysis menkei	Menke's chrysidid wasp
	Chrysis tularensis	Tulare chrysidid wasp
	Cicindela hirticollis gravida	Sandy beach tiger beetle
*	*Cicindela ohlone*	Ohlone tiger beetle
	Coelus globosus	Globose dune beetle
	Coelus gracilis	San Joaquin dune beetle
	Desmocerus californicus dimorphus	Valley elderberry longhorn beetle
*	*Euphilotes enoptes smithi*	Smith's blue butterfly
	Euphydryas editha bayensis	Bay checkerspot butterfly
*	*Fissilicreagris imperialis*	Empire Cave pseudoscorpion
*	*Helminthoglypta sequoicola consors*	Redwood shoulderband (snail)
*	*Helminthoglypta walkeriana*	Morro shoulderband (=banded dune) snail
*	*Hubbardia secoensis*	A schizomid arachnid; no common name
	Hydrochara rickseckeri	Ricksecker's water scavenger beetle
	Hydroporus leechi	Leech's skyline diving beetle
	Icaricia icarioides missionensis	Mission blue butterfly
*	*Icaricia icarioides moroensis*	Morro Bay blue butterfly
*	*Idiostatus kathleenae*	Pinnacles shieldback katydid

	Incisalia mossii bayensis	San Bruno elfin butterfly
*	*Lichnanthe albipilosa*	White sand bear scarab beetle
	Lichnanthe ursina	Bumblebee scarab beetle
	Linderiella occidentalis	California linderiella
	Lytta hoppingi	Hopping's blister beetle
	Lytta morrisoni	Morrison's blister beetle
*	*Meta dolloff*	Dolloff Cave spider
*	*Microcina edgewoodensis*	Edgewood Park micro-blind harvestman
	Microcina homi	Hom's micro-blind harvestman
*	*Minymischa ventura*	Ventura chrysidid wasp
*	*Necydalis rudei*	Rude's longhorn beetle
*	*Neochthonius imperialis*	Empire Cave pseudoscorpion
	Nothochrysa californica	San Francisco lacewing
*	*Optioservus canus*	Pinnacles optioservus riffle beetle
*	*Philanthus nasalis*	Antioch sphecid wasp
*	*Polyphylla barbata*	Mount Hermon (=barbate) June beetle
*	*Polyphylla nubila*	Atascadero June beetle
*	*Protodufourea wasbaueri*	Wasbauer's protodufourea bee
*	*Protodufourea zavortinki*	Zavortink's protodufourea bee
*	*Socalchemmis monterey*	Monterey socalchemmis spider
*	*Speyeria adiaste adiaste*	Unsilvered fritillary
	Speyeria zerene myrtleae	Myrtle's silverspot
*	*Stygobromus mackenziei*	Mackenzie's cave amphipod
*	*Thessalia leanira elegans*	Oso Flaco patch butterfly
	Trachusa gummifera	A megachilid bee; no common name
*	*Trimerotropis infantilis*	Zayante band-winged grasshopper
*	*Trimerotropis occulens*	Lompoc grasshopper
	Tryonia imitator	Mimic tryonia (=California brackishwater snail)

* denotes taxon is endemic to region

The Wildlife Species Matrix, including data on listing status, habitat association, and population trend for each vertebrate and invertebrate species included on the Special Animals List, is available on the Web at http://www.dfg.ca.gov/habitats/wdp/matrix_search.asp. For vertebrates, the matrix also includes links to species-level range maps. Additionally, a link to the California Department of Fish and Game's online Field Survey Form is available to assist in reporting positive sightings of species on the Special Animals List to the California Natural Diversity Database (CNDDB).

Two Species at Risk

Note: *The following discussion of two species at risk illustrates how stressors or threats affect species and highlights conservation challenges and opportunities. These species discussions are not intended to imply that conservation should have a single-species approach.*

The threats facing the California red-legged frog and the San Joaquin kit fox illustrate some of the most important conservation issues in the region. The expanding vineyards and rural residential developments impinging on San Joaquin kit fox movement corridors reflect the land-use changes threatening habitat connectivity throughout the region. Habitat protection for the San Joaquin kit fox also will require ecologically sound grazing lands management. The California red-legged frog depends on the region's aquatic habitats. In many areas of the Central Coast, aquatic systems have been severely altered, both by watershed-wide land uses and increasing demands for water for human use.

California Red-Legged Frog

Karen McClymonds

California red-legged frogs live in aquatic, riparian and, less frequently, upland habitats. Frogs depend on streams, ponds (both natural and artificial stock ponds), and wetlands with relatively deep and slow-moving water, but they also spend considerable time in riparian areas with relatively dense shrubby or emergent vegetation and travel through upland areas when dispersing.

Throughout its range, the frog is threatened by habitat loss and fragmentation caused by urban and residential development, draining of wetlands, reservoir construction, water diversion, and predatory non-native species. Development or flood-control activities that disconnect creeks and rivers from their floodplains isolate frogs in limited habitat areas and restrict their access to different habitat types. Habitat and water quality are degraded by sediment and chemical runoff from inappropriate agricultural, rangeland, and forestry practices and from urban areas. Non-native plant species reduce the suitability of riparian habitats, while introduced fish, crayfish, and bullfrogs prey on California red-legged frogs. Bullfrogs are favored by such factors as elevated water temperatures and permanent water sources, conditions that occur in human-disturbed areas.

The California red-legged frog has been eliminated from more than 70 percent of its historic range and now occurs in only 238 drainages, representing about 10 percent of those it historically occupied. Of these remaining populations, only four support more than 350 adult frogs (USFWS 2001). The species was federally listed as threatened in 1996 and is a Fish and Game species of concern. The largest remaining populations of California red-legged frog occur in the coastal watersheds of Monterey, San Luis Obispo, and Santa Barbara counties in both streams and rangeland stock ponds (USFWS 2002e). Protection of the frog in the Central Coast region is therefore a high priority. Within this region, where frog populations have declined, the greatest threats are increasing numbers of exotic aquatic predators, livestock grazing in riparian areas, and decreased freshwater flows due to water use by increases in human population numbers (USFWS 2006).

Important conservation measures highlighted by the U.S. Fish and Wildlife Service's *Recovery Plan for California Red-legged Frog* include improved habitat management on agricultural land and rangelands, including establishing rangeland water quality plans, maintaining livestock ponds that provide habitat for the frog and controlling invasive species in these ponds; protecting minimum instream flows and natural hydrologic regimes; and developing exotic-species control measures for non-native vegetation and predatory introduced-wildlife species (USFWS 2002e). The recovery plan recommends that conservation efforts be focused on watersheds that currently support healthy red-legged frog populations, on corridors that provide dispersal opportunities, and on areas where good environmental and habitat conditions favor the persistence or reestablishment of red-legged frogs. For these areas, the U.S. Fish and Wildlife Service suggests developing watershed management plans that include land-use guidelines and priority locations for conservation, protection, and restoration efforts.

Jeremy Rowell

San Joaquin Kit Fox

Historically, the San Joaquin kit fox was widely distributed across the San Joaquin Valley floor, with smaller populations extending into both the foothills of the Sierra Nevada and the slopes and basins of the Coastal Ranges. Although the San Joaquin kit fox has been federally listed as endangered since

1967 and state listed as threatened since 1971, its status throughout most of its range is poorly known. As of 1975, California's kit fox population was estimated at about 7,000, representing a decline of between 20 percent and 43 percent from estimates made before 1930, and population numbers have likely declined since the 1970s (USFWS 1998h).

In the Central Coast region, the kit fox is presently found in the interior ranges of Monterey and San Benito counties, the upper portions of the Pajaro and Salinas watersheds, the Cuyama watershed, and the Carrizo Plain. With only about 5 percent of the San Joaquin Valley's original natural areas remaining untilled and undeveloped, these Central Coast habitats, particularly the Carrizo Plain, are important for the species' survival (Stafford 2004 pers. comm., USFWS 2004).

Kit foxes inhabit grasslands and scrublands. Primarily active at night, foxes hunt and forage over substantial distances, preying upon both rodents and insects. Researchers estimate the average home range size to be 1.7 square miles (Cypher et al. 2001). Some foxes have been recorded traveling over distances of between 25 and 50 miles (USFWS 1998h).

The principle threats to the species are habitat loss and fragmentation resulting from agricultural, residential, and commercial development (CDFG 2005b). Other human-induced mortality factors include shooting, poisoning, and being killed on roads. Kit foxes also face predation by and competition with other canine species, including coyote, non-native red fox, and domestic dogs. Predation, disease, and droughts that reduce prey numbers can cause large fluctuations in kit fox population numbers. Well-managed rangelands constitute important kit fox habitats, and appropriate grazing can thin out exotic grasses and improve habitat for prey species. However, kit foxes can also be harmed by overgrazing that eliminates vegetative cover and depletes rodent and insect prey species and by rodent control practices that reduce prey numbers or result in secondary poisonings (USFWS 1998h). In southern Monterey County and in San Luis Obispo County, vineyard expansion and housing developments along the Highway 101 and Highway 46 corridors pose substantial threats to kit fox habitats and movement corridors (Stafford 2004 pers. comm.).

The U.S. Fish and Wildlife Service's Recovery Plan for this species calls for the protection of a complex of fox populations (a **metapopulation**), including three core populations (the Carrizo Plain, western Kern County, and Ciervo-Panoche Natural Area) and smaller populations across the species' geographic range. The plan also recommends protecting remaining connections between populations to counteract interbreeding or declines in any one population (USFWS 1998h).

The Recovery Plan recommends efforts to improve habitat conditions on agricultural and ranch lands, so these lands can serve to maintain connectivity between population centers. Research is needed to determine the rangeland management and agricultural practices that provide usable habitat and promote prey species. Other research needs identified by the Recovery Plan include monitoring of distribution and status, studies of interactions with other canines, and studies of the effects of predator control programs.

Stressors Affecting Wildlife and Habitats

- Growth and development
- Intensive agriculture
- Excessive livestock grazing
- Water management conflicts and degradation of aquatic ecosystems
- Recreational pressures
- Invasive species

Growth and Development

Population growth in the Central Coast has mirrored the rapid pace of growth seen statewide, with the region's population growing by approximately 13 percent to approximately 1.5 million between 1990 and 2000 (CDOF June 2004, DWR 2004). Throughout the region, urban acreage increased by 32 percent (from 182,000 acres to 241,000 acres) between 1980 and 1990 (DWR 1993) and by another 22 percent (to 293,000 acres) by 2002 (CDF 2002).

Historically, population pressures have been greatest along the coast, with inland areas primarily occupied by large ranches, agriculture, and small agricultural towns. The largest coastal population centers are Santa Cruz (with a population of 255,600 as of 2000); Monterey, Marina, and Seaside (86,500); San Luis Obispo (44,200); and Santa Barbara (92,300).

In recent years, growth pressures have shifted inland, with urban and rural residential development centered along the Highway 101 corridor. In the northern portion of the region, affordable housing draws commuters from San Jose to rapidly expanding towns like Morgan Hill (which grew by 40 percent to a population of 33,600 between 1990 and 2000), Gilroy (32 percent, to 41,500), Hollister (79 percent, to 34,400) and Watsonville (42 percent, to 44,300) (CDOF June 2004). Incorporated cities in the Salinas Valley have also seen substantial growth in recent years. In the northern portion of the valley, Salinas grew by 39 percent,

to 151,100, between 1990 and 2000. In the southern Salinas Valley, Paso Robles grew by 30 percent, to 24,300, and Atascadero by 14 percent, to 26,400 (CDOF June 2004).

Coastal towns south of San Luis Obispo have also grown substantially. Arroyo Grande, Pismo Beach, and Grover Beach grew by 11 percent to a combined population of 37,500 between 1990 and 2000. Increasing growth pressures for infrastructure and services for these coastal towns extend southward and inland toward Orcutt and Buellton in the Santa Maria and Santa Ynez river valleys. In the Santa Maria River valley, Santa Maria city grew by 26 percent, to 77,400, and in the Santa Ynez River valley, Solvang, Lompoc, and Buellton grew by 10 percent to a combined total of 50,200 residents between 1990 and 2000 (CDOF June 2004).

Urbanization increases air and water pollution from industrial emissions, sewage systems, and urban runoff. Growth patterns often include residential projects located far from existing urban centers, resulting in an increased need for roads and utilities. Communities designed with large lot sizes preserve little open space. These developed areas and infrastructure corridors not only result in direct loss of habitat but also fragment the natural landscape and degrade the quality of adjacent habitat.

Even outside the portions of the region undergoing rapid growth, unused oil-lease lands and large cattle ranches that are no longer profitable are being acquired by land investors and sold as 40-acre to 160-acre residential parcels. This rural residential development also requires additional road infrastructure and fragments the natural landscape.

Fragmentation hinders ecological processes that require landscape connectivity, such as natural fire regimes, movement of wide-ranging species, and genetic exchange, and makes remaining natural lands more vulnerable to pollution and invasion by exotic plants and animals (Soule and Terbourgh 1999).

Intensive Agriculture

The Central Coast's mild, seasonally moist climate and fertile soils support a highly productive agricultural industry. Approximately 890,000 acres, or 11 percent of the region's land area, are planted in irrigated row crops, vineyards, and orchards (CDC 2002). The most extensive agricultural areas are fertile river valleys and coastal terrace lands. Major crops include lettuce, artichokes, asparagus, and strawberries, with some areas also supporting orchard-grown fruits and nuts and dry-land, unirrigated winter grains, such as barley. While these agricultural lands provide important crops for California's food supply and for export, many of the intensive agricultural practices that have enabled such large-scale production

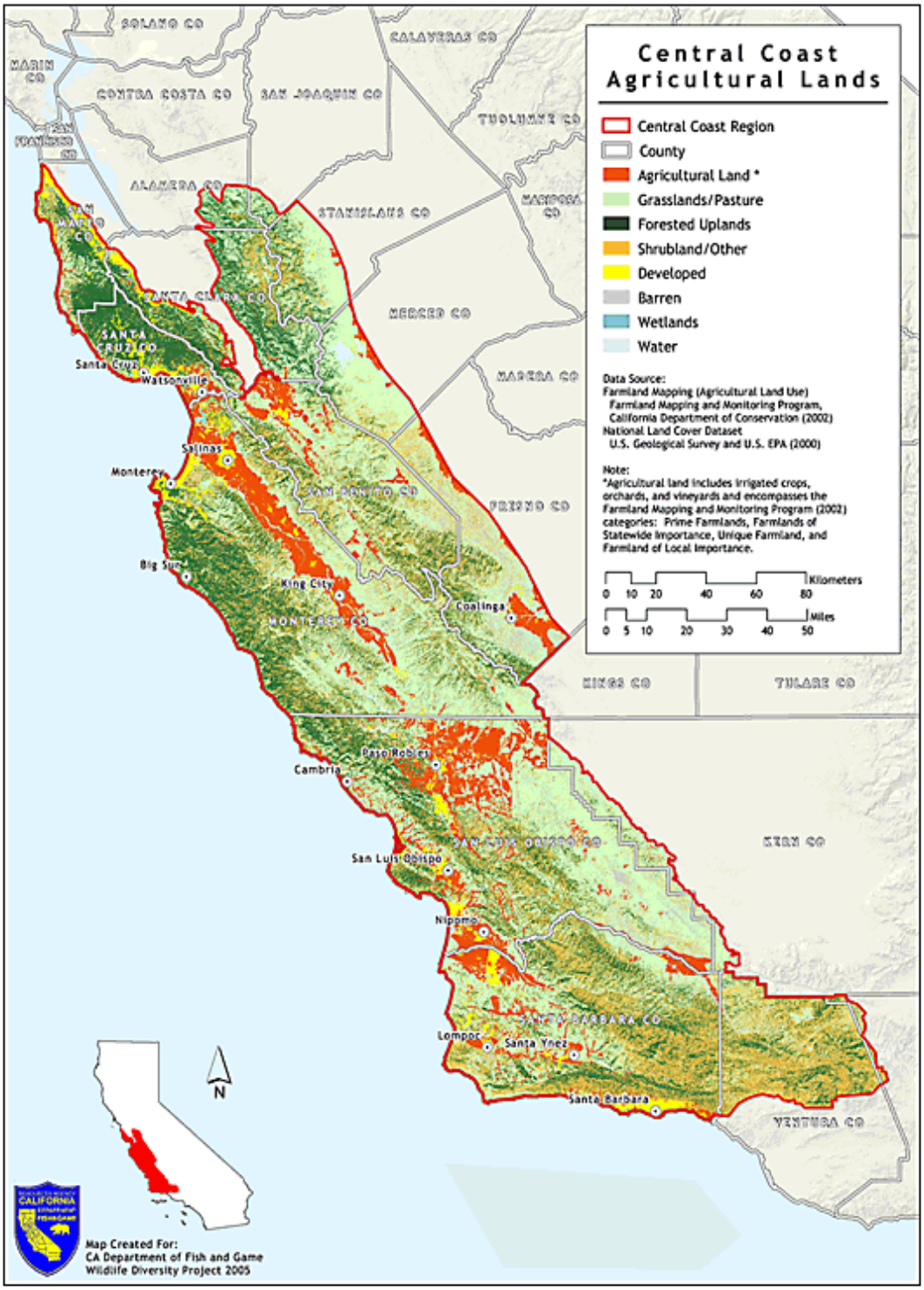


Fig. 10.1: Central Coast Agricultural Land
Many of the region's river valleys and coastal terrace lands are dominated by agricultural land uses (irrigated crops, orchards, and vineyards).

also result in ecological problems. Agricultural consequences for the region's wildlife and ecosystems include runoff of agricultural chemicals and sediment, consumption of over-subscribed water resources, and conversion and fragmentation of habitat. Private landowners and local conservation districts are working on numerous projects to mitigate these consequences, to improve water quality, and to enhance conditions for wildlife on the agricultural working landscapes of the region.

Many of the region's crops receive substantial applications of fertilizers, herbicides, and pesticides. In 2001, Monterey County—which encompasses two major agricultural regions, the Salinas Valley and lower Pajaro Valley—ranked fourth in the state for the total pounds of pesticide applied (CDPR 2001, Newman et al. 2003). Exposed soils and irrigation practices make croplands susceptible to erosion. Rain and irrigation runoff carry silt and agricultural chemicals, degrading surface water quality and sometimes reaching groundwater. Herbicides and pesticides can have toxic effects on aquatic plants and animals, and chemical contaminants can upset the ecological balance of aquatic systems. For example, nutrients increase aquatic plant and algal growth, resulting in lowered oxygen levels when the excessive plant matter decomposes. Elevated nutrient levels have also been implicated in amphibian deformities, because nutrient-rich environments favor the parasitic flatworm that causes deformities in many frog species (Johnson and Chase 2004). Silt and sediment also degrade aquatic environments, increasing turbidity and shading out aquatic vegetation, along with scouring away or smothering stream-bottom sediments that are important spawning sites and invertebrate habitats.

Runoff problems are particularly severe on steeply sloping, erosion-prone soils, where strawberries, artichokes, and vineyard grapes are commonly grown. On sloped agricultural fields near Elkhorn Slough, soil erosion after heavy rain is estimated to be from 30 to 140 times greater than from natural lands (Caffrey et al. 2002). Planting practices that result in large amounts of soil disturbance, such as the establishment of vineyards and strawberry and artichoke mounds, also contribute substantially to sediment runoff.

Agricultural water consumption also threatens aquatic and riparian habitats. Irrigated agriculture accounts for about 70 percent of the Central Coast's water use (DWR 2005a). Over the last century, the increased production of water-intensive crops like strawberries and lettuce has increased the need for water. Water is supplied to agriculture by diversion of surface water, by groundwater pumping, and through import from other regions via the State Water Project. As of 1995, groundwater provided about 84 percent of the region's water supply, and 20 percent

of that was considered **overdraft**, exceeding the amount of incoming water replenishing the aquifers (DWR 1993, 2003a). As groundwater levels are depleted, flows are also reduced in streams and rivers. Diminished flows reduce aquatic systems' capacity to discharge incoming contaminants and sediment and can inhibit migration by anadromous fish.

The completion of the coastal branch of the State Water Project to San Luis Obispo and Santa Barbara counties in 1997 fostered the expansion of water-intensive agricultural practices in the southern portion of the region, including the establishment of irrigated vineyards and flood-irrigation in the Santa Maria Valley, both of which consume large amounts of water and contribute to runoff.

The growth of agriculture over the last century, particularly along valley-bottom floodplains and coastal terraces, has resulted in both the loss of important habitat areas and the fragmentation of larger natural landscapes. In recent decades, intensively cultivated crops (such as vineyards) have been expanding into areas formerly used for grazing and dry-land grain production. Intensive agricultural crops almost entirely eliminate wildlife habitat values and tax water resources.

Since 1990, the Central Coast has seen substantial growth of vineyards into both grazing lands and natural habitats, including oak woodlands and chaparral. Vineyard acreage region-wide increased by 36 percent between 1998 and 2001 (DWR 2005a). In Monterey County, vineyard acreage increased from 21,000 acres in 1991 to 38,000 acres in 2001 (Newman et al. 2003). In San Luis Obispo County, Paso Robles has been a center of vineyard expansion, and approximately 28,500 acres of new vineyards were established in the county between 1996 and 2004 (DWR 1996, SLO Co. Ag. Comm. 2004). In Santa Barbara County, approximately 10,000 new acres of vineyards were established in the Santa Maria, Los Alamos, and Santa Rita valleys in the four years between 1996 and 2000 (USFWS 2000a).

Near Paso Robles, vineyard expansion is encroaching on important San Joaquin kit fox corridors. Additionally, in preparation for vineyard cultivation, "deep-ripping" plowing practices are often used to break up dense soil layers so that water can penetrate more deeply; this disturbs natural drainage patterns and inhibits the formation of seasonal ponds (USFWS 2000a). In Santa Barbara County, the expansion of vineyards and the resulting fragmentation and destruction of California tiger salamanders' seasonal pool and upland habitats led the U.S. Fish and Wildlife Service in 2000 to make an emergency listing of the salamander's Santa Barbara population as endangered (USFWS 2000a). Establishment of vineyards can also pave the way for future residential development. If vineyards are not financially

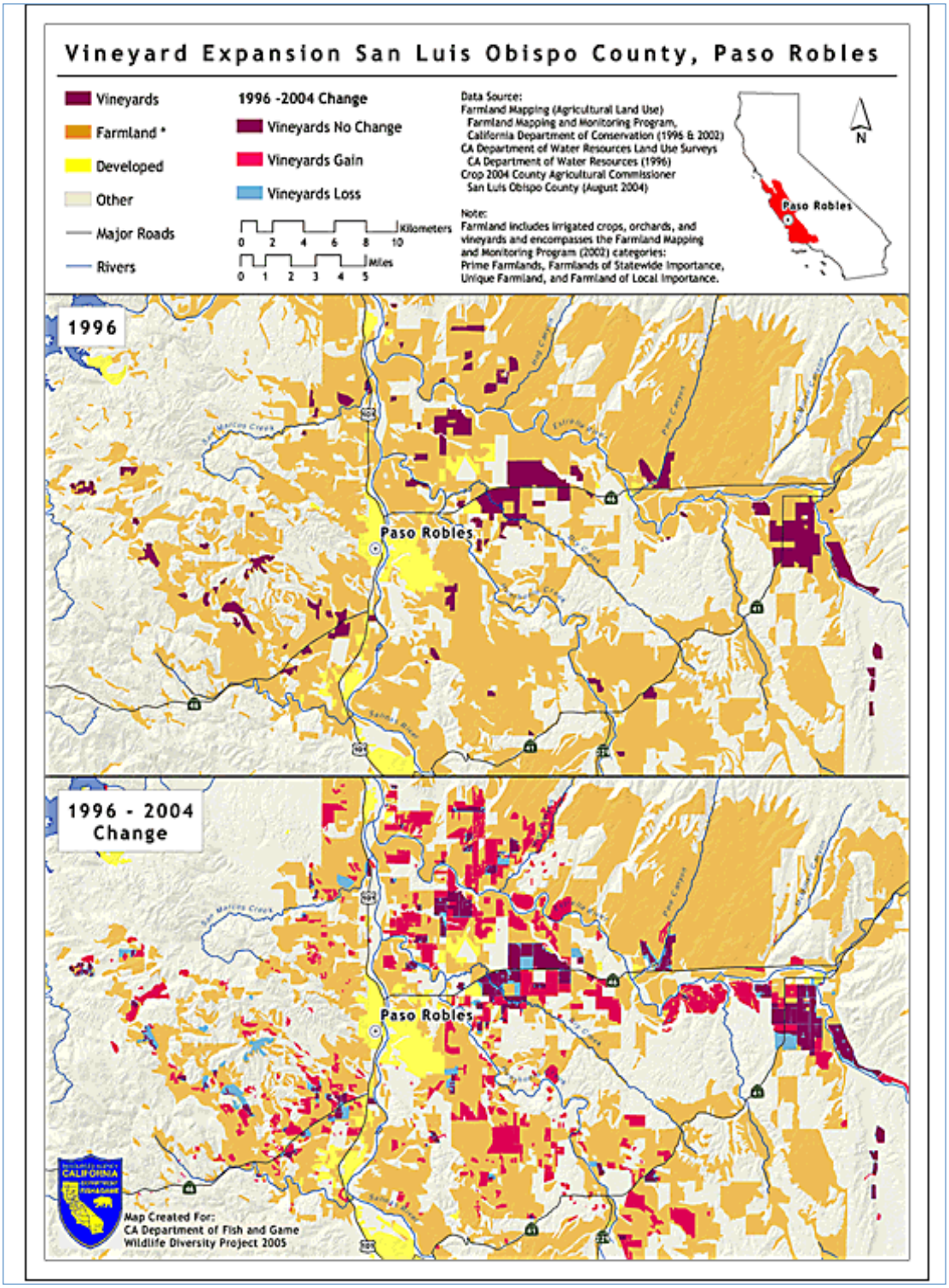


Fig. 10.2: Vineyard Expansion
In the last decade, vineyard acreage has increased dramatically in the Central Coast Region. More than 28,000 acres of new vineyards were established between 1996 and 2004 in the area surrounding Paso Robles. Other parts of the region have seen similar levels of vineyard expansion.

successful, most of the natural values that would restrict development permits are lost, and the water lines and road infrastructure needed to support residential development are already in place.

Excessive Livestock Grazing

Livestock grazing is widespread throughout the Central Coast region, especially on expansive ranch lands across the inland hills and mountain ranges (Newman et al. 2003, Thorne et al. 2002). Private grazing lands are estimated to total approximately 4.8 million acres, or 60 percent of the region's land area (FRAP 2003). Many public and conservation lands are also open to grazing, and Fish and Game, State Parks, and private land trusts make use of grazing as a habitat management tool. Grazing leases are also held on approximately 46 percent of the 1.7 million acres (Stephenson and Calcarone 1999) of the Los Padres National Forest lands within the region and on about 66 percent of the 300,000 acres of BLM land (FRAP 2003, Germano et al. 2001, Weiss 1999).

The effects of grazing on wildlife vary from beneficial to detrimental, depending upon how it is managed, including the seasonality and duration of grazing and the type and number of livestock. These effects also depend on the relative sensitivities of individual wildlife species, since not all species respond the same way to grazing.

Well-managed livestock grazing can benefit sensitive plant and animal species, particularly by controlling annual grasses and invasive plants where these have become established (Germano et al. 2001, Weiss 1999). For example, livestock grazing can benefit California tiger salamander populations by keeping annual grasses cropped relatively short, which enables the salamander to travel between breeding ponds and upland habitats, and also favors small mammal species, like the California ground squirrel, that create underground burrows inhabited by the salamander. Livestock can also prevent annual grasses' growth from choking off small seasonal pools (Marty 2005). These working lands are an essential part of the solution to conserving the state's wildlife.

While recognizing the values of appropriate grazing practices, this report is required to focus on stressors affecting wildlife species at risk. Thus, the following discussion describes those situations where excessive grazing practices stress wildlife species at risk. Excessive grazing, as used here, refers to livestock grazing at a frequency or intensity that causes degradation of native plant communities, reduces habitat values for native wildlife species, degrades aquatic or other ecosystems, or impairs ecosystem functions. Many of the region's

oak woodlands are currently managed for livestock production. Livestock grazing is one factor hindering oak regeneration. Livestock consume oak seedlings and inhibit oak germination by compacting soils and disturbing leaf litter, which reduces soil moisture. Annual forage grasses also compete with oak seedlings for soil, light, and water (Barbour et al. 1993, Stephenson and Calcarone 1999). Abundant seed production by forage grasses increases rodent populations, and rodents also consume oak shoots.

Approximately 25 percent of California's rare plants and at least 10 percent of the state's endemic plant species occur in serpentine habitats (TNC 1997). Because of the limited and patchy distribution of these soils, unique serpentine ecological communities are often restricted to small, island-like areas. Excessive grazing can eliminate or substantially reduce these small populations.

While well-managed grazing may benefit native species by controlling exotic plants, excessive livestock grazing in riparian areas and vernal pools can cause problems for sensitive species associated with these environments—including California red-legged frog, spadefoot toads, Western pond turtle, and fairy shrimp species—because cattle will congregate in these habitats to use them as water sources. Livestock trampling of stream channels results in the destabilization and collapse of stream banks, elimination of deep pool areas, and widening of streams and pools, which results in increased temperatures, greater surface area, and faster evaporation (Moyle 2002, USFWS 2000a). Water runoff and soil erosion increase on cattle trails; trails produce 40 times more sediment than vegetated surfaces (CDFG 2004g). These changes alter channel shape and hydrology. Increased sediment can also shade out aquatic plants, fill important pool habitats, and scour away or smother important spawning sites and invertebrate habitats. Livestock waste also degrades water quality by contributing to elevated nutrient and microorganism levels.

Livestock also often reduce the coverage and alter the composition of riparian and wetland vegetation. This can diminishes the vegetation's capacity to filter runoff entering waterways. Loss of plant cover also reduces shade and raises water temperatures, resulting in lower dissolved oxygen content in the water (CDFG 2004g).

Besides reducing streamside vegetation and riparian habitat, livestock can have direct negative effects on native riparian species by trampling or disturbing amphibian egg masses and crushing rodent burrows that are required by amphibians for summer dormancy, affecting sensitive species such as the California red-legged frog, California tiger salamander, and Santa Cruz long-toed salamander (USFWS 2002e).

Appendix G lists good information resources regarding practices and standards for appropriate grazing management that improve conditions for wildlife and ecosystems.

Water Management Conflicts and Degradation of Aquatic Ecosystems

Throughout the Central Coast region, rivers, riparian habitats, and coastal wetlands have been degraded by the use of water resources, flood control efforts, and the effects of surrounding land uses. Resource-extraction practices, such as instream gravel mining and runoff from adjacent mining or forestry operations, also affect some regional watersheds. All of these various activities, alone or in combination, result in changes to the timing and volume of instream flows, alterations to river channel shape and instream habitat availability, and decreases in water quality, including elevated water temperature. In the region's urbanized areas, expanding coverage of the landscape by paved surfaces increases the amount of runoff and urban pollutants (CDFG 2004g).

Within the region's major watersheds, tributaries flowing through relatively undeveloped uplands are more ecologically intact, while the main-stem sections running through agricultural and urban valleys have undergone the greatest degradation. Lowland riparian areas, which once supported floodplain forests of deciduous riparian trees and shrubs, including sycamore, willow, and cottonwood, are one of the most diminished of the Central Coast's ecosystems. In many valley riparian areas, exotic species, including tamarisk and giant reed, have replaced willow and cottonwood, and low-elevation fish species, such as Coast range sculpin, tule perch, and Sacramento perch, have been **extirpated** or reduced (TPL 2001). While **salmonids** persist in nearly all of the regional waterways where they were historically present, their population numbers are substantially smaller.

Efforts to control flooding and stream-channel courses often accompany agricultural and urban land uses. Increased runoff and higher flows from agricultural and urban areas can result in flooding problems, and residential, commercial, or agricultural landowners in floodplains do not want their lands subject to floods. Flood-control efforts can include vegetation removal, dredging, channelization, **riprap** and energy dissipaters, construction of dams and levees, and, in areas where agricultural fields abut stream channels, repeated stream bank recontouring using heavy equipment.

Restricting or altering the shape of river channels disconnects a river from its natural floodplain and eliminates the benefits of natural flooding regimes, such as deposition of river silts on valley floor soils, recharge of wetlands, and flushing flows that prevent clogging of

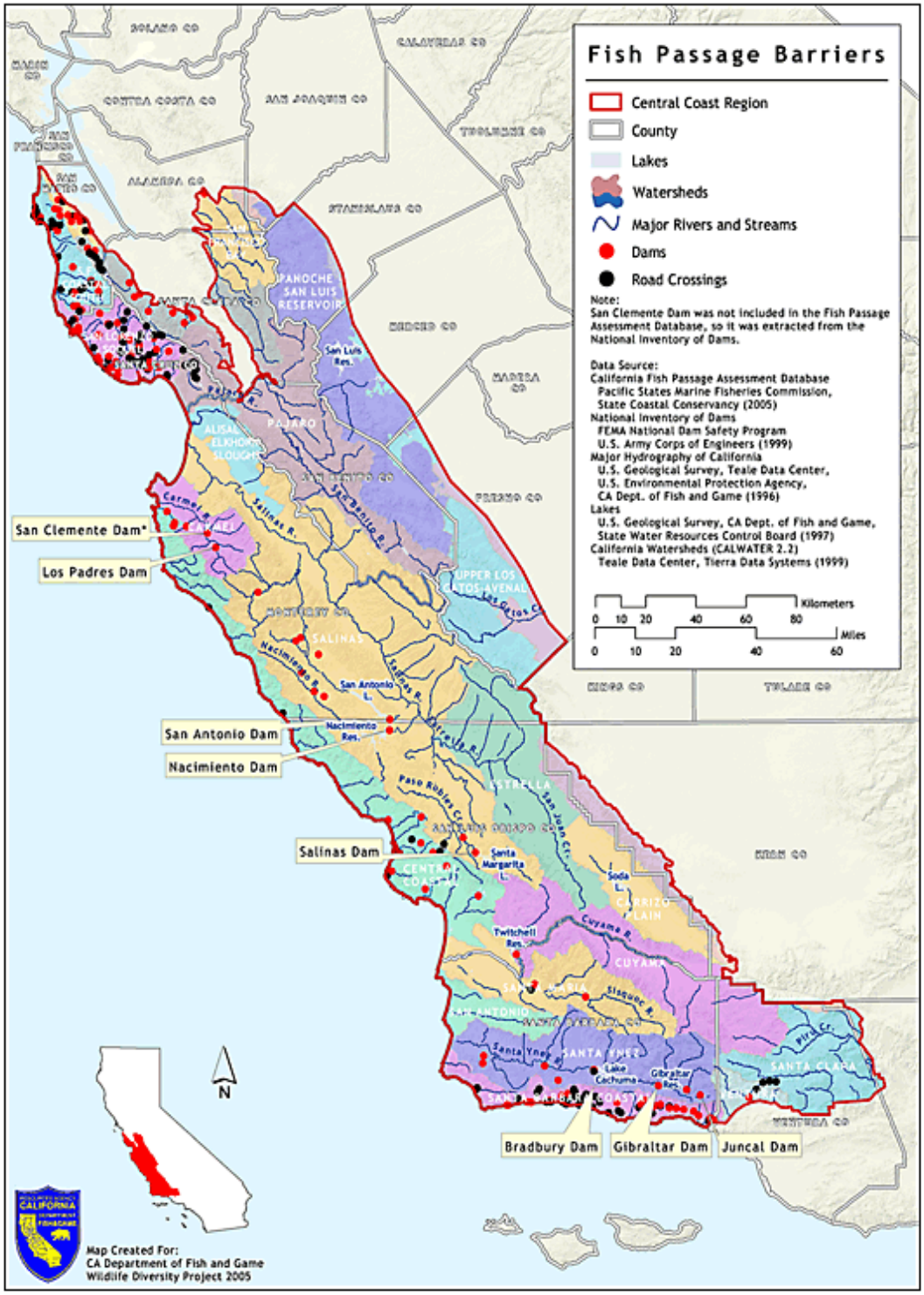


Fig. 10.3: Barriers to Fish Passage
Dams and smaller structures such as road crossings can fragment watersheds. As shown above, more than 70 dams and roads create complete barriers to fish passage.

small coastal streams. Recontouring levees and stream banks with heavy equipment results in the deposit of heavy sediment loads into the waterway.

Water diversions, dams and on-stream reservoirs, and groundwater extraction (along with imported water from the Central Valley and the Bay-Delta region) provide the region's residential and agricultural water supply. Water development activities can obstruct rivers, alter the timing and volume of river flows, and exacerbate water quality problems. Dams, diversions, and the resulting low instream flows bring about habitat conditions that preclude use by anadromous fish and block their migration to spawning grounds. Reduced flows also diminish aquatic systems' capacity to dilute contaminants and transport sediments. With limited water remaining, rivers may dry up before reaching their ocean outlets, or sediments may clog river mouths. For example, over a three-year period from 1988 to 1990, Carmel River flows were too low to breach the sand bar at the river's ocean mouth owing to the combined effects of drought, surface diversions, and groundwater pumping (CDFG 1996). Other artificial structures, such as culverts, low-water road crossings, pipeline crossings, and bridges, also block migration, stream flows, and sediment transport.

Although mining operations are not widespread in the Central Coast region, impacts at affected locations can be substantial. Instream gravel mining removes gravel from the stream channel, interrupting natural sediment transport processes, deepening and degrading the channel, and creating noise disturbance. Mining operations adjacent to rivers can result in sediment or other contaminant runoff. Both instream and adjacent mining can increase water temperature and turbidity and destroy spawning habitat (CDFG 2004g). The Pajaro River watershed has been severely degraded both by hydrologic alterations resulting from in-stream gravel mining and by declines in water quality due to historical mercury mine runoff. Gravel mining alongside the Arroyo Seco waterway in Monterey County has eliminated unique sycamore alluvial riparian forests (Newman et al. 2003).

Forestry land uses are fairly limited in the region, but the effects of timber harvesting are notable in coastal streams of San Mateo and Santa Cruz counties (CDFG 2004g, USFWS 2002e). Exposed soils and disturbance from logging roads increase sedimentation, while reductions in vegetative cover result in elevated stream temperatures and loss of instream debris that provides cover for fish (CDFG 2004g, USFWS 2002e). Changes in the amount and timing of incoming sediment reduce spawning habitats and success.

Urbanization and agricultural activities that degrade regional rivers also affect the coastal wetlands and estuaries fed by these waterways, resulting in sedimentation and reduced water

supply. Hydrological alterations such as dikes and berm construction also harm wetland function. Moreover, excavation of naturally occurring sand bars and beaches to drain lagoons or create accessible harbors alters tidal flow and can result in both changes in salinity and scouring flows that degrade habitats and cause erosion. Unseasonal breaching of lagoons for flood control can also cause direct mortality of young anadromous fish that use them as rearing habitat (Wilcox 2005 pers. comm.) and negatively affect the breeding of tidewater goby (a Fish and Game species of concern and federally listed as endangered) (USFWS 2004b).

Recreational Pressures

Recreational pressures threaten some Central Coast habitats, particularly those that are limited in distribution and sensitive to disturbance. Beaches and dunes, serpentine habitats, and riparian areas on public lands are of particular concern.

Recreational off-road vehicle use can have pervasive effects on ecological communities. In the Central Coast, areas of greatest concern are interior forest areas in the Los Padres National Forest lands and sensitive serpentine soil areas. Off-road vehicle trails open relatively undisturbed forest areas to increased use. The vehicles can disturb or run over wildlife. They can also change plant communities by crushing or uprooting plants, causing soil compaction that prevents germination, and spreading seeds of invasive plants (Hall 1980). Changes in vegetation composition affect available habitats for invertebrates and other wildlife. Soil disturbance contributes to erosion and sedimentation of aquatic habitats. Serpentine soils are particularly susceptible to disturbance by vehicles, and the resulting erosion can contribute naturally occurring toxic metals to surrounding aquatic systems.

In beach and dune environments, growing numbers of hikers are causing increased disturbance of nesting and foraging shorebirds, including Western snowy plovers. These activities are significant on the beach and dune systems from Monterey north to the Salinas and Pajaro river mouths, which harbor a number of sensitive species, including black legless lizard, Smith's blue butterfly, and sandmat manzanita.

Invasive Species

As in other regions of California, invasive species present a noteworthy threat to the Central Coast's biological diversity and are tied to regional land uses. Besides introduced species, some native species thrive and increase in number in human-altered habitats. These

species may compete with or prey upon other native species, sometimes negatively affecting their populations.

Native brown-headed cowbirds have greatly expanded their range and have undergone population increases because they thrive in suburban areas and on agricultural and grazing lands. Cowbirds can lower the reproductive success of other native birds by laying their eggs in those birds' nests, causing the targeted host birds to raise the cowbird nestlings at the expense of their own. Native raccoons, whose populations have greatly increased near housing developments and recreation facilities, threaten some native reptile species—notably Western pond turtles—due to egg predation.

Introduced feral pigs are a major problem in many habitat types across the region. Feral pigs root in the soil, creating excessive soil disturbance and decimating native plant communities. In oak woodlands, feral pigs can inhibit the germination and growth of young oaks by eating acorns and oak seedlings and removing leaf litter, causing soils to dry out (Sweet 2005 pers. comm.). In beach and dune habitats, the introduced red fox increases predation rates for sensitive coastal shorebirds such as the light-footed clapper rail (federally and state listed as endangered).

In aquatic habitats, native reptile, amphibian, fish, and invertebrate populations are threatened by predation and competition with introduced fish, crayfish, red-eared slider turtles, and bullfrogs. The most significant predatory fishes include sunfish, mosquito fish, bullhead catfish, and largemouth bass. Some of these species, including mosquito fish, bullfrog, and crayfish, require year-round water sources to complete their reproductive cycle. Many of the region's aquatic habitats, including ephemeral streams and seasonal ponds, naturally go dry in the rainless summer months. However, water management practices that create permanent water sources, including the creation of impoundments and some agricultural practices, favor these invasive species. The bullfrog, for example, a documented predator of the California red-legged frog, can tolerate elevated water temperatures and can make use of standing water habitat created by agricultural practices (USFWS 2002e). California tiger salamander populations are threatened by hybridization with non-native tiger salamander species introduced to the region as fishing bait (Bolster 2005 pers. comm.). In estuarine environments, non-native invertebrates, such as the European green crab and Japanese mud snail, are competing with native invertebrates and altering food chain dynamics (Caffrey et al. 2002).

As noted in the section on livestock grazing, a number of the region's highly invasive exotic plant species are associated with inappropriately grazed rangelands and pastures,

including starthistle species, medusahead, and black mustard. Other invasive plant species in the region, including Pampas grass and cape ivy, either are or have been sold as ornamental plants and have escaped from cultivation.

Numerous invasive plant species are established in the region's beaches, dunes, sandy coastal soils, and lowland areas. Outcompeting and displacing native plant communities, these invasive species often provide inferior habitat for wildlife. Veldt grass, associated with sandy soils, can shift native shrub communities toward grasslands and is of particular concern in San Luis Obispo and Santa Barbara counties, notably at Vandenberg Air Force Base, Guadalupe Nipomo Dunes, and around Morro Bay (Bossard et al. 2000). On beaches and dunes, ice plant species, European beach grass, and Veldt grass form monocultures and dense mats of vegetation and displace native plants that provide important habitat for invertebrates like Smith's blue butterfly. Dense growth of non-native vegetation also causes unnatural stabilization of beach and dune systems. Jubata and Pampas grass are most invasive near Big Sur, Elkhorn Slough, and around the lower slopes of the Santa Cruz mountains. In timbered areas, these grasses can form dense stands that inhibit the germination of such coastal forest species as redwoods (Bossard et al. 2000). Cape ivy chokes out native vegetation with densely growing vines. Found most commonly in shady coastal lowlands, cape ivy also invades oak woodlands, riparian forests, coastal scrub, and Monterey pine forests (Bossard et al. 2000).

Aquatic systems also face a number of threats from invasive plant species. In watersheds subject to high levels of agricultural land use, such as the Salinas, Pajaro, and Santa Ynez drainages, giant reed and tamarisk species replace native riparian vegetation and provide lower-quality habitat for sensitive species such as least Bell's vireo, California red-legged frog, Western pond turtle, and kit fox. Because giant reed and tamarisk provide limited shade, proliferation of these species also results in higher water temperatures and lower levels of dissolved oxygen (Bossard et al. 2000).

Conservation Actions to Restore and Conserve Wildlife

In addition to the recommended regional actions described below, see the recommended statewide conservation actions as given in Chapter 4.

a. Wildlife agencies should establish regional goals for species and habitat protection and work with city, county, and state agency land-use planning processes to accomplish those goals.

See Statewide Action a in Chapter 4.

Priorities specific to this region include:

Areas experiencing rapid population growth and development would benefit from improved conservation planning to protect habitat values and environmental quality.

As an example, the current Monterey County General Plan Update represents an important regional opportunity to enact land-use policies that could serve as a regional and statewide model. Regionally, some of the greatest development pressures are felt in the remaining unprotected open space areas of Monterey County. Inland, rapid population growth is occurring in the Salinas and Pajaro river valleys. Along the coast, there are limited areas remaining for development. To the north, the northern portion of Santa Cruz County is largely protected by General Plan restrictions, Local Coastal Plans and State Parks and University of California management, and southern Santa Cruz County is built out to the maximum extent possible. As a result, strong development pressures are focused on the open space areas between the Santa Cruz–Monterey County line and the protected Big Sur coastline south of Yankee Point.

Monterey County's General Plan has not been updated since 1982, and the existing plan does not adequately address these strong growth pressures. A General Plan Update process has been under way for nearly a decade, three times generating draft documents, but has failed to result in the adoption of a final plan.

To preserve critical habitat areas in the county—including increasingly rare maritime chaparral and Monterey pine forest habitats, valley oak woodlands, coastal dune and grassland habitats of the endemic Smith's blue butterfly, and aquatic habitats supporting California red-legged frog—it is critical that a General Plan Update be completed to direct development to the most appropriate areas. The Monterey County Board of Supervisors should adopt a plan that incorporates strong land-use planning policies, sound conservation planning principles, and proactive implementation ideas, many of which were developed in the 2003 Draft General Plan Update document. For additional information, see Monterey County General Plan Update at the end of this chapter.

For further discussion of goals and ways to improve integration of conservation planning with land-use planning, see the Conservation Planning section in Chapter 6.

b. Federal, state, and local agencies, along with nongovernmental organizations, should work with private landowners and land managers to implement agricultural land and rangeland management practices that are compatible with wildlife and habitat conservation.

See Statewide Action h in Chapter 4.

Priorities specific to this region include:

The Central Coast Regional Water Quality Control Board and interests from the agricultural industry should continue their partnership to develop and implement the Agricultural Permit/Waiver Program that will require the agricultural landowners and managers to take courses on and implement management practices that protect environmental quality.

(See also Appendix G, Information Sources for Wildlife and Habitat Conservation on Private Lands.)

c. Federal, state, and local agencies, along with nongovernmental organizations, should work with private landowners to both continue and develop programs that help keep grazing land uses profitable.

Continued operation of private ranchlands is the most economically viable and practical way to preserve the Central Coast's wildlife diversity. At current funding and staffing levels for wildlife agencies and conservation organizations, the acquisition of sizeable rangeland parcels is rare, and large-scale restoration of native grasslands and oak woodlands is not feasible. Compared to residential and commercial development, grazing lands remain relatively open to wildlife movement and hold possibilities for future restoration efforts, if such efforts are needed. Grazing can control invasive exotic plant species and the impenetrable thatch formed by non-native annual grasses. Well-managed rangelands also provide valuable ecological services. Because they are permeable to rainfall and support vegetative cover and microbial soil communities, these rangelands contribute to aquifer recharge, erosion control, and nutrient cycling and offer resources used by insect pollinators of crops and natural vegetation.

- **Continue and expand the California Department of Fish and Game's Private Lands Management Program,** which allows private landowners to collect hunting fees if they manage their property in a wildlife-friendly manner and provide access to hunters.
- **Continue counties' efforts to enroll private ranchlands in the state Williamson Act program,** which supports private ranchers by reducing property taxes on lands in agricultural use. The state should continue to compensate counties for tax revenues lost on properties enrolled in Williamson Act contracts.

- **Develop additional tax-benefit or other financial-incentive programs at the local, state, and federal level for landowners who follow grazing management guidelines that protect wildlife habitat and rangeland health.** For example, Fish and Game's Landowner Incentive Program provides funding for management and enhancement of wildlife habitat on private lands along with annual incentive payments.
- **Support private initiatives to develop certification and labeling programs** for ecologically sustainable grazing practices for use by both private landowners and lessees on public lands.

See also Appendix G, Information Sources for Wildlife and Habitat Conservation on Private Lands.

d. Federal, state, and local agencies, along with nongovernmental conservation organizations, should work to protect large, relatively unfragmented habitat areas, wildlife corridors, and underprotected ecological community types.

Means for protection may include developing Natural Community Conservation Plans (NCCPs), establishing **conservation banks,** employing conservation easements and management agreements with landowners, and acquiring public land from willing sellers.

- **Prevent the fragmentation of large habitat areas by residential and commercial development or transportation infrastructure.**

  See Statewide Actions b and c in Chapter 4.

  Priorities specific to this region include:

  In consultation with public wildlife agencies and private resource consultants, nongovernmental conservation organizations have completed regional analyses to identify important core areas that are relatively free of roads, ecologically intact, and well buffered (Thorne et al. 2002, TNC 2005, Gallos 2005). These analyses are largely based upon wildlife agencies' data (including the California Natural Diversity Database and other sources) and incorporate Fish and Game biologists' expert opinion. Fish and Game should use and build upon these analyses to continue to clarify and prioritize conservation areas where the state's resources should be focused.

  Transportation planning should give high priority to preserving large core habitat areas, and, when possible, locate future highway or rail construction along existing transportation corridors. Current transportation proposals include several proposed roads that would bisect the Mount Hamilton area and a high-speed rail line that would bisect a number of regional State Park lands. If implemented, these proposals would fragment wildlands and important wildlife habitat areas.

- **Protect habitat linkages between large wildland areas.**

  See Statewide Action d in Chapter 4.

  Priorities specific to this region include:

Potential San Joaquin kit fox corridors running from Camp Roberts southeast along the Salinas River to the Carrizo Plain and Kern County and northeast toward the Cholame Hills are a priority for study and protection.

Ranching and other land uses that preserve unfragmented landscapes in the Cuyama Valley in southern San Luis Obispo County should be maintained to allow movement by wide-ranging species, including tule elk that have been reintroduced on the Carrizo Plain and San Joaquin kit fox.

Wildland areas in the Purisma and Soloman hills in Santa Barbara County should be protected to connect the Los Padres Forest with important habitat areas on the coast at Vandenberg Air Force Base.

Preserving a corridor along the Pajaro River and adjacent lands from the Santa Cruz Mountains to the Diablo Range and Santa Lucia Mountains is also important for wide-ranging species.

More research is needed to determine the routes currently in use by wide-ranging species. Additional resources for information about regional wildlife corridors can be found in the California Wilderness Coalition's *Guide to wildlands conservation in the Central Coast region of California* (Thorne et al. 2002), the *Conception Coast Project* (Gallos 2005), and from local land trusts.

- **Protect underprotected ecological community types.**
These include oak woodlands, serpentine habitats, maritime chaparral, riparian floodplain communities, vernal pools, native grasslands, and old-growth redwood forests (Davis et al. 1998, Thorne et al. 2002, TNC 2005). The California Gap Analysis Project prepared by the University

Tim Palmer

of California, Santa Barbara, provides useful analysis of the protection status of natural community types across the state (Davis et al. 1998).

e. Federal, state, and local public agencies should sufficiently protect sensitive species and important wildlife habitats on their lands.

Public agencies should adopt management policies that safeguard natural resources and wildlife habitat, even as they manage for multiple uses or mandates that emphasize other objectives. Management policies and practices must protect sensitive habitats from recreational uses. Recreational areas should be carefully chosen, and use restrictions should be adequately enforced, especially in fragile coastal habitats or riparian areas where there is a high potential for conflict between sensitive species and even passive recreational uses (such as hiking). Infrastructure and resource-extraction projects should be designed and sited to avoid harmful effects on sensitive species and habitats. Where grazing uses are appropriate, agencies should employ, and encourage lessees to implement, ecologically sustainable management practices.

The Los Padres National Forest encompasses 1.6 million acres in the Central Coast, including much of the Santa Lucia and Transverse ranges. The Forest Service must adopt a Resource Management Plan for the Los Padres National Forest that protects wildlife habitats and diversity, and Congress needs to appropriate adequate funds to implement the plan.

Important actions for inclusion in the forest's Resource Management Plan are:

- Protect streams and watersheds. Where alternative water sources are available to meet existing water rights, remove water diversions on forest stream systems.
- Institute protective land use designations (as Critical Biological Zones and Research Natural Areas) for areas in the forest that support sensitive species or unique or highly diverse biological communities.
- Minimize the negative effects of the grazing leases that are in place on approximately 46 percent of Los Padres National Forest lands. Careful grazing management practices are critical for sensitive habitats, including riparian areas and streams, grasslands, wildflower fields, and coastal scrub and chaparral habitats of the federally listed endangered Smith's blue butterfly.
- Institute appropriate fire management policies and practices, based on the best available science and site-specific conditions, to restore the ecological integrity of forests. Continued research is needed to better understand the fire regimes required to maintain the health of different vegetation communities.
- Prohibit new road development in roadless areas that serve as California condor habitat and in the biologically significant watersheds in the Matilija, Chumash, Dick Smith, Sespe, Ventana, and Silver Peak wilderness areas.

- Limit expansion of new roads and off-road-vehicle use areas. Close roads and prohibit off-road-vehicle use in biologically significant and sensitive areas, particularly riparian habitats. Develop areas for intensive recreational access and off-road-vehicle use in the least-sensitive forest areas so as to direct pressures away from sensitive habitats.

Bureau of Land Management lands encompass more than 310,000 acres in the region, including expansive grasslands and serpentine areas. Important management actions and issues for BLM lands include:

- Minimize the negative effects of the grazing leases that are in place on approximately 66 percent of BLM lands. Careful grazing management practices are critical for sensitive habitats, including serpentine and barrens areas on San Benito Mountain and in the Panoche, Tumey, and Kettleman hills and native grassland communities and vernal pools. Further surveys and GPS documentation are needed to locate and protect remaining patches of native or rare vegetation communities. Continue to develop and fund grazing management research at Carrizo Plain National Monument through management partnerships with Fish and Game and The Nature Conservancy.
- Restrict off-road-vehicle use in serpentine habitats. Finalize and implement the newly developed use-designations limiting off-road-vehicle use in serpentine habitats at BLM's Clear Creek Management Area. Increase funding to provide an adequate enforcement presence. Current annual funding appropriations do not fully cover even one protection officer; four to six officers are needed on busy weekends.
- Appropriately locate and plan power transmission lines and energy development projects on BLM lands to minimize impacts on sensitive resources. In particular, along the eastern slope of southern Diablo Range (from Coalinga to Los Banos), proactive conservation planning is needed to address the potential negative effects of powerline construction, proposed wind-power development, and oil exploration on sensitive kit fox habitat and serpentine areas.

Lands managed by state agencies, such as State Parks and Fish and Game, encompass more than 330,000 acres in the region. Among these are numerous coastal habitats and large blocks of natural lands, including 87,000 acres at Henry Coe State Park in Santa Clara County and an 80,000-acre easement (held jointly by the state and nongovernmental partners) on the Hearst Ranch in San Luis Obispo County. Important management actions and issues for these lands include:

- Preserving unfragmented and relatively undisturbed open space areas and wildlands within the region's state lands. This should be a priority when planning regional transportation corridors.
- Continuing to implement protective actions to prevent recreational users from disturbing sensitive species. In coastal habitats, fencing and visitor education for both hikers and off-road vehicle users are important at Western snowy plover and least tern nesting sites.

- Where grazing land uses are appropriate, employing careful prescription-grazing practices, critical to protect sensitive habitats and rare plant communities.

The region's larger military installations (U.S. Army's Fort Hunter Liggett, California Army National Guard's Camp Roberts, and Vandenberg Air Force Base) encompass more than 312,000 acres. The region also houses several smaller military bases, including Concord Naval Weapons Station and the Naval Postgraduate School in Monterey. These military lands support more than 70 sensitive species, including Western snowy plover, sage sparrow, San Joaquin kit fox, California red-legged frog, California tiger salamander, arroyo toad, and steelhead, and significant ecological communities, including oak woodlands, serpentine soils, native grasslands, vernal pools, and maritime chaparral. The military mission is often compatible with wildlife habitat needs, because large, open-space areas are preserved for training exercises, which also provide large, unfragmented habitat areas. With an average of only 10 percent to 15 percent of military lands developed, military installations provide a significant contribution to regional wildlands.

- Renew and continue to implement adequately protective Integrated Natural Resource Management Plans (INRMPs) on military installations. Currently, all of the Central Coast's installations currently have INRMPs approved or under review by Fish and Game and the U.S. Fish and Wildlife Service. State and federal wildlife agencies should continue to work with military installations to set goals for wildlife populations and habitats on military lands, update and implement INRMPs that will achieve those goals, and measure accomplishments.
- Encourage livestock operators with grazing leases on military lands to implement ecologically sustainable grazing practices.
- Increase resources for invasive plant management at Vandenberg Air Force Base and Fort Hunter Liggett.
- Continue coastal scrub and maritime chaparral restoration at Vandenberg Air Force Base.
- Continue research on oak woodland ecology at Camp Roberts and Fort Hunter Liggett; apply findings regarding fire and grazing management to address the Sudden Oak Death pathogen and to oak woodland management across the state (CAANG 2001, Zack 2002).
- Continue support for invasive species management (including bullfrogs, non-native fish, and crayfish) to secure large populations of arroyo toads on Fort Hunter Liggett and red-legged frogs on Vandenberg Air Force Base.
- Ensure protection of sensitive species and wildlife habitats if any of the region's military facilities are identified for base closures. State, federal, and local wildlife agencies and other nongovernmental conservation organizations must be well-informed about and prepared to safeguard these land's natural resource values.

f. Federal, state, and local agencies should work to restore fish passage in aquatic systems important for anadromous and wide-ranging fish populations.

Efforts to restore fish passage may require multiagency partnerships involving such state and local agencies as the State Water Resources Control Board, Caltrans, local water districts, city and county public works departments, and Fish and Game; federal agencies, such as NOAA (National Oceanic and Atmospheric Administration) Fisheries, the National Marine Fisheries Service, and the Federal Energy Regulatory Commission; and nongovernmental organizations, such as Trout Unlimited, land trusts, and watershed councils. The cooperation of private owners of dams and water supply companies will also be needed.

- Continue to inventory and assess barriers to fish passage, update and maintain the Coastal Conservancy's database of barriers, and use the database to prioritize and seek opportunities to implement fish passage improvement projects (CDFG 2004g). The Coastal Conservancy's database is available at http://www.calfish.org, under the Fish Passage Assessment link.
- Where possible, remove or modify structures and barriers to allow passage. Install fish ladders or other means of passage around dams, diversions, and other impediments, including road crossings, pipelines, and culverts. Monitor fish-passage improvement projects to assess benefits to fish populations and to document lessons learned.
- Consider removal of dams that are not structurally sound, whose reservoirs are full of sediment, or those not providing significant hydropower or water supply benefits.

g. State and local agencies should allocate sufficient water for ecosystem uses when planning for and meeting regional water supply needs. Providing adequate water for wildlife and instream uses is particularly important in systems that support sensitive species or important habitat areas.

See Statewide Action e in Chapter 4.

Planning efforts may require participation by a wide range of agencies, including state and regional water resources quality control boards; local water districts; California Department of Housing and Community Development; county and city governments; government associations; private water supply companies; and large-scale water users, such as agricultural operations.

Priorities specific to this region include:

- Conduct research to determine stream-flow needs for anadromous fish and other aquatic fauna, particularly below dams.

- Plan and scale residential, commercial, and agricultural growth according to available water resources. Utilize realistic assessments of water resources for county and city planning.
- When counties subdivide or rezone land, account for the creation of new water rights (such as new riparian rights) with mitigations or conditions to limit the expansion of water rights (CDFG 2004g).
- Improve the process for approving new water diversion and development permits or renewals.
- Maintain or increase local government, water district, and state agency funding for water conservation programs (e.g., water metering, water use restrictions, and subsidies for technologies that reduce water consumption), and allocate a major portion of the conserved water surpluses to ecosystem uses, rather than to new development that increases demand.

h. State and federal agencies should work to protect and restore biologically significant regional river systems.

Benefits to water quality and sensitive aquatic species can be achieved by preserving natural functioning in aquatic systems. To the extent possible, rivers should be managed, protected, and restored to maintain a functional connection between river and floodplain, preserve riparian vegetation and habitat, maintain natural channel courses and sediment transfer capacity, and improve water quality. Upland natural areas and vegetation buffers should also be retained or restored to the extent possible to provide water quality benefits and wildlife habitat, along with passive recreation opportunities.

- Develop and implement watershed plans in order to meet **Total Maximum Daily Load** (TMDL) standards and achieve Clean Water Act compliance. The Regional Water Quality Control Board and U.S. Environmental Protection Agency should also continue to refine TMDL standards by region to reflect natural, historical conditions.
- Where flood control requires engineering solutions and hydrologic modifications, maintain or mimic natural **fluvial** processes and flow regimes where possible. Engineers and involved agencies (e.g., U.S. Army Corps of Engineers) should work with state and federal wildlife biologists to minimize negative effects on aquatic species and habitats and to restore riparian habitats and upland buffers.
- Where gravel mining affects biologically significant watersheds, monitor mining sites to ensure that sufficient streambed gravel remains to preserve channel structure and function. Where mining has occurred historically, restore river-channel structure to allow such natural river functions as flooding and sediment transport.

i. Federal, state, and local agencies should provide greater resources and coordinate efforts to eradicate or control existing occurrences of invasive species and prevent new introductions.

See Statewide Action f in Chapter 4.

Priorities specific to this region include:

- Develop effective control methods for starthistle. Research combination treatments of burning and integrated pest management.
- Increase control efforts for tamarisk and giant reed in riparian areas, particularly along the Salinas and Pajaro rivers and in the Panoche Creek and Silver Creek drainages.
- Increase efforts to control invasive aquatic animals, including bullfrogs and crayfish, through a combination of eradication and trapping efforts and by managing aquatic systems to mimic naturally intermittent flows.

The Monterey County General Plan Update

There currently are competing ideas about the direction that Monterey County's General Plan Update should take. In 2003, after five years of preparation that included an investment of over $5 million, a third Draft General Plan Update was completed and was unanimously recommended to the County Board of Supervisors by the County Planning Commission. The Draft Plan aimed to focus development in existing urban areas, preserve the region's agricultural lands, protect air and water quality, meet the region's water supply needs, and provide affordable housing convenient to employment locations. In response to objections by development and business interests to the Draft Plan's land-use restrictions, the County Board of Supervisors rejected the Draft Plan and appointed a new General Plan Update team, which is now working on a revised Draft Plan.

A coalition of citizens and local and statewide environmental groups* has organized to preserve the proactive planning policies of the 2003 draft document. The coalition initiated its own planning process, including large-scale public meetings, to develop an alternate General Plan Update by citizen mandate. The Community General Plan document (which meets the legal requirements for a General Plan) was completed and provided to the Board of Supervisors in January 2005. This alternate General Plan Update document could provide examples of planning policies that adequately protect wildlife diversity while addressing other community needs and could inform the work of the current General Plan Update team. The document is available on the Web: http://www.co.monterey.ca.us/pbi/gpu/.

* Members of the coalition include the Planning and Conservation League; LandWatch Monterey County; Citizens for Responsible Growth; Prunedale Neighbors Group; Carmel Valley Association; Sierra Club, Ventana Chapter; California Native Plant Society; Ocean Conservancy; and others.

Conversion of Native Grasslands to Introduced Annual Grasslands

Livestock and annual forage grasses were introduced to the Central Coast more than 150 years ago, and large portions of the landscape have undergone high-intensity, year-round grazing (Barbour et al. 1993, Newman et al. 2003, Thorne et al. 2002). The pervasiveness and long history of livestock grazing have transformed large portions the region's grassland communities. Remaining native grasslands and meadows occur primarily as isolated patches within larger areas of introduced annual grasslands. Across the region, native perennial grasslands are estimated at about 30,000 acres, while non-native annual grasslands cover approximately 4 million acres and account for nearly half of the region's vegetation (Davis et al. 1998, Thorne et al. 2002). Loss of native grasses is particularly severe in the drier inland areas, where arid conditions favor the establishment of drought-tolerant, non-native species.

Records that document use of native grasslands by wildlife are limited, making it difficult to assess the affects of native grassland declines on wildlife populations. The loss of these grasslands has had a substantial impact on regional vegetation, with nearly 50 plant species of native grasslands considered rare (CNDDB, CNPS 2001). These changes in the species composition and structure of grasslands have had variable effects on wildlife species because of differences in the way these species use the landscape and habitat features. Populations of some wildlife species, including the federally and state listed endangered blunt-nosed leopard lizard, grassland nesting birds, including the grasshopper sparrow, and invertebrates associated with rare plants, have declined along with native grasslands. However, non-native grasslands provide valuable habitats for numerous regional wildlife species, including black-tailed jackrabbit, California ground squirrel, tule elk, sensitive species such as the mountain plover, and many small mammals that provide a large prey-base for raptor species. Carefully managed livestock grazing can serve as an important tool to improve habitat for some sensitive species, including San Joaquin kit fox, giant kangaroo rat, and California tiger salamander.

Many biologists consider introduced annual grasslands to be a naturalized community type, because most grasses are not invasively expanding their range, and they function as an important habitat component in the mosaic of community types across the region. Moreover, large rangeland areas provide continuous open space areas critical for wildlife movement and ecological function.

Stressors Affecting Some Major Regional River Systems and Coastal Wetlands

Salinas River Watershed

- Sediment and chemical pollutants, notably nitrate and pesticides, from agricultural runoff
- Water development and diversion, with agriculture accounting for 94 percent of total water use
- Major overdraft and seawater intrusion in the Salinas Valley groundwater basin
- Sedimentation resulting from bulldozing of river banks to control channel migration and flooding
- Removal of riparian habitat within the active floodplain for flood control
- Channelization of the mouth of the Salinas River
- Salmonid passage blocked by low instream flows and three major impoundments (the Salinas, Nacimiento, and San Antonio dams)
- Instream gravel mining
- Invasive exotic plant and animal species
- Reduction of steelhead numbers and range resulting from dams, water quality degradation, and drought; remaining steelhead are largely landlocked

Pajaro River Watershed

- Sediment and chemical pollutants from agricultural runoff
- Major overdraft and seawater intrusion in the Pajaro Valley groundwater basin
- Threats to habitat and water quality from off-road vehicle use
- Instream sand and gravel mining in one of the watershed's major tributaries (the San Benito River)
- Nearby historical mercury mining
- Invasive exotic plant and animal species
- Clearing of riparian vegetation as part of flood-control efforts along much of the river
- Channelization of the majority of the mainstem Pajaro River to provide flood protection and to facilitate agricultural drainage
- Current planning for a large-scale Army Corps of Engineers flood control project
- Declines of annual steelhead runs from between 1,000 to 2,000 fish in the 1960s to remnant runs today

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Stressors Affecting Some Major Regional River Systems and Coastal Wetlands, cont.

Carmel River

- Two major impoundments (San Clemente and Los Padres dams) altering natural flow regimes and impeding salmonid passage
- Critically low flows and dewatering of surface flows, broadening of the channel, and loss of riparian habitat resulting from water development
- Depletion of the lower Carmel Valley aquifer resulting from groundwater pumping beyond legal limits (exceptions to pumping limits are made annually, because water supply is needed)
- Declines of annual steelhead runs from approximately 20,000 fish in the 1920s to just a few hundred in the 1990s

Santa Maria Watershed (Cuyama and Sisquoc rivers)

- A major impoundment on the Cuyama River (Twitchell Reservoir) altering natural flow regimes and disconnecting the upper Cuyama from the Santa Maria and Siquoc rivers
- The Santa Maria Project on the Santa Maria River, capturing seasonal floodwaters and altering natural flood processes
- Reliance upon groundwater sources for irrigation resulting in severe drawdown of groundwater levels in the Cuyama Valley, eliminating cottonwood gallery forest and resulting in a river that dries up along a portion of its length and experiences flash floods
- High water demands in the upper Cuyama Valley due to the cultivation of crops grown using water-intensive overhead spray irrigation, notably broccoli, brussel sprouts, alfalfa, and carrots
- Invasive exotic plant and animal species
- Gravel mining on the mainstem of the Cuyama

Santa Ynez River

- Sediment and chemical pollutants from agricultural runoff
- Extensive clearing of riparian vegetation for flood-control efforts
- Invasive exotic plant and animal species
- Instream gravel mining
- Low flows and occasional drying up of surface flows as a consequence of groundwater pumping

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Stressors Affecting Some Major Regional River Systems and Coastal Wetlands, cont.

- Three major impoundments (Gibraltar, Bradbury, and Juncal dams), altering natural flow regimes and blocking salmonid passage
- Critically low flows owing to insufficient water releases below Bradbury Dam
- Near-extirpation of steelhead due to insufficient flows; historically, the Santa Ynez supported one of the largest southern steelhead runs, estimated between 12,000 to 25,000 fish

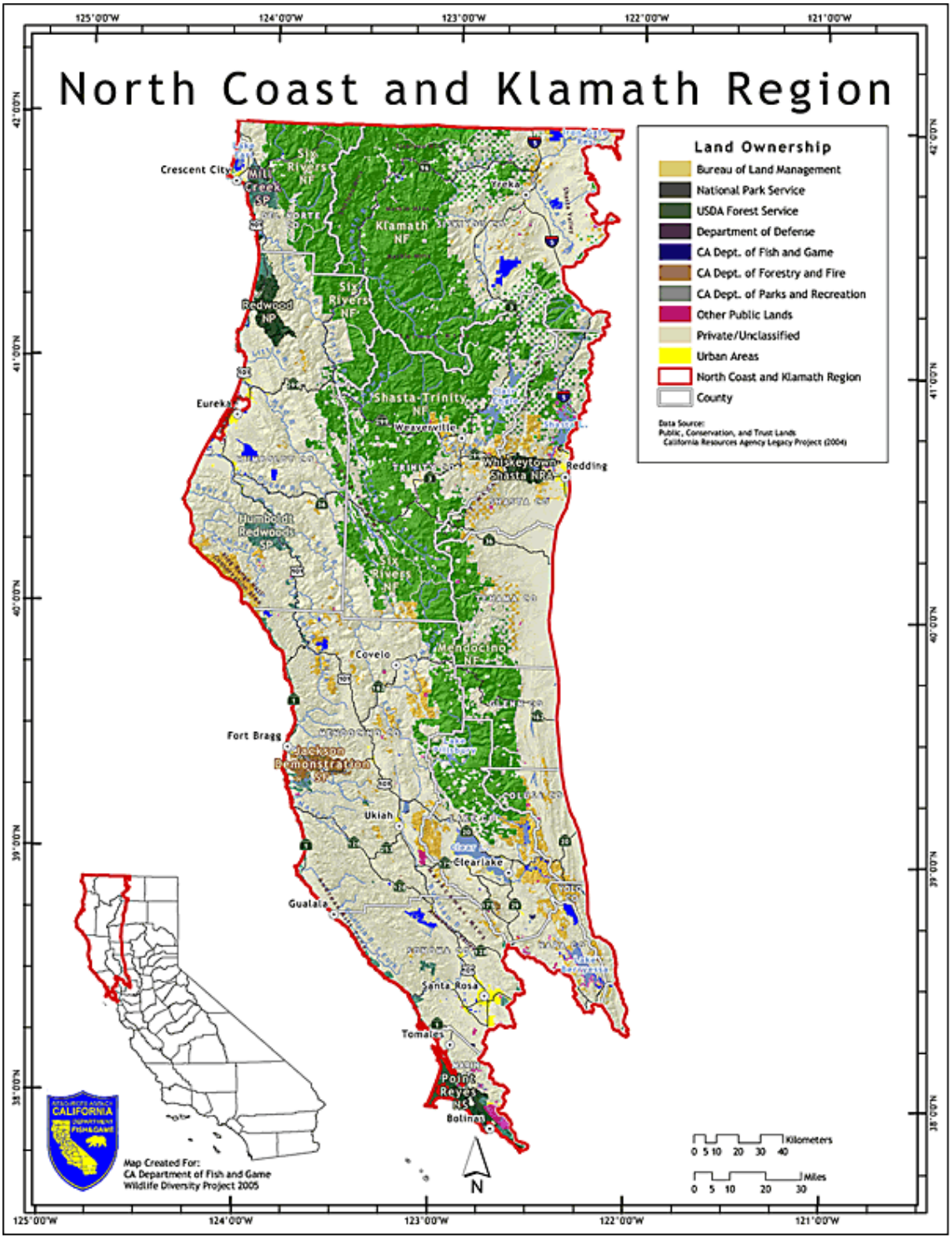
Morro Bay

- Sediment, chemical pollutants, and microbiological contaminants from agricultural runoff
- Microbiological contamination and water quality degradation resulting from septic systems

Elkhorn Slough

- Sediment and chemical pollutants from agricultural runoff
- Hydrologic alterations, including construction of a berm for a railroad and the opening of Moss Landing Harbor, resulting in the loss of 50 percent of the marsh's historical acreage

Sources: CDFG 1996, DWR 2003a, DWR 2005a, Page and Shuford 2000, TPL 2001


North Coast and Klamath Region
125°00'W
124°00'W
123°00'W
122°00'W
121°00'W
42°00'N
41°00'N
40°00'N
39°00'N
38°00'N
Land Ownership
Bureau of Land Management
National Park Service
USDA Forest Service
Department of Defense
CA Dept. of Fish and Game
CA Dept. of Forestry and Fire
CA Dept. of Parks and Recreation
Other Public Lands
Private/Unclassified
Urban Areas
North Coast and Klamath Region
County
Data Source:
Public, Conservation, and Trust Lands
California Resources Agency Legacy Project (2004)
Crescent City
Mill Creek SP
Six Rivers NF
Klamath NF
Redwood NP
Eureka
Shasta-Trinity NF
Weaverville
Trinity
Redding
Whiskeytown Shasta NRA
Humboldt Redwoods SP
Covelo
Mendocino NF
Fort Bragg
Jackson Demonstration SF
Ukiah
Clearlake
Lake Pillsbury
Gualala
Santa Rosa
Tomales
Point Reyes NS
Bolinas
Yreka
Map Created For:
CA Department of Fish and Game
Wildlife Diversity Project 2005
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